

UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 69J13

RAILROAD STREET

OVER

STORM SEWER

DISTRICT 1 – ST. LOUIS COUNTY, CITY OF DULUTH



PREPARED FOR THE

MINNESOTA DEPARTMENT OF TRANSPORTATION

BY

COLLINS ENGINEERS, INC.

JOB NO. 5221

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure unit inspected a structure No. 69J13, a concrete box culvert, was found to be in good condition with no defects of structural significance.

INSPECTION FINDINGS:

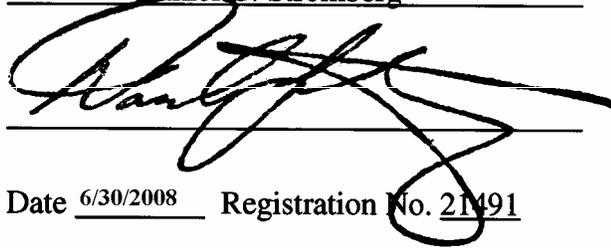
- (A) Overall, the concrete of the culvert was in good condition with no notable deterioration.
- (B) The joints between the culvert sections exhibited from $\frac{1}{4}$ to 1 inch maximum horizontal gap (no clear openings due to tongue and groove arrangement), and vertically, there was up to a $\frac{1}{2}$ inch differential across various joints.
- (C) The channel bottom consisted of silt (6 inches maximum) on top of the culvert floor.

RECOMMENDATIONS:

- (A) Reinspect the submerged substructure at the normal maximum recommended (NBIS) interval of five (5) years.

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Daniel G. Stromberg

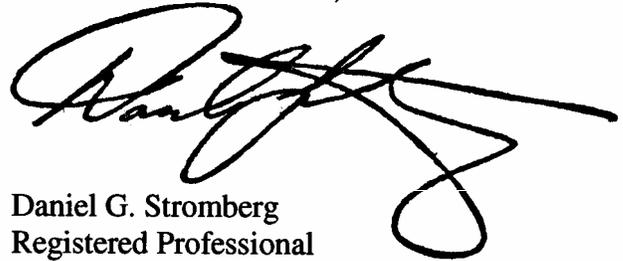


A large, stylized handwritten signature in black ink, appearing to read 'Daniel G. Stromberg', is written over a horizontal line.

Date 6/30/2008 Registration No. 21491

Respectfully submitted,

COLLINS ENGINEERS, INC.



A large, stylized handwritten signature in black ink, appearing to read 'Daniel G. Stromberg', is written over a horizontal line.

Daniel G. Stromberg
Registered Professional
Engineer, State of Minnesota

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: 69J13

Feature Crossed: Storm Sewer

Feature Carried: Railroad Street

Location: District 1 – St. Louis County, City of Duluth

Bridge Description: The structure consists of a precast concrete box culvert. The inlet top is covered with a metal grate (needs to be removed to facilitate inspection).

2. INSPECTION DATA

Professional Engineer Diver: Daniel G. Stromberg, P.E., S.E.

Dive Team: Clayton G. Brookins, Valerie Rouston

Date: October 15, 2007

Weather Conditions: Partly Cloudy, 48° F

Underwater Visibility: None / Negligible

Waterway Velocity: None / Negligible

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Culvert.

General Shape: Precast Box Culvert (12' wide by 4' high).

Maximum Water Depth at Substructure Inspected: Approximately 1.3 feet.

4. WATERLINE DATUM

Water Level Reference: Top surface of culvert box.

Water Surface: The waterline was approximately 2.7 feet below the reference.

Waterline Elevation 601.7.

5. NBIS CODING INFORMATION (Minnesota specific codes are used for 92B and 113)

Item 60: Substructure: Code 7

Item 61: Channel and Channel Protection: Code 8

Item 92B: Underwater Inspection: Code B/10/07

Item 113: Scour Critical Bridges: Code F/07

Bridge is scour critical because abutment or pier foundation is rated as unstable due to observed scour at bridge site.

 Yes X No



Photograph 1. View of Inside of Culvert Box, Looking Southeast.



Photograph 2. View of Southwest Wall beneath the West Side of the Road, Looking Northwest.



Photograph 3. View of Northeast Wall beneath the East Side of the Road, Looking Northeast.



Photograph 4. View of Northwest Culvert Opening, Looking East.



Photograph 5. View of West Side of Opening, Looking Southwest.



Photograph 6. View of East Side of Opening, Looking Southeast.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES
DAILY DIVING REPORT

INSPECTORS: Collins Engineers, Inc. DATE: October 15, 2007

ON-SITE TEAM LEADER: Daniel G. Stromberg, P.E., S.E.

BRIDGE NO: 69J13 WEATHER: Partly Cloudy, 48° F

WATERWAY CROSSED: Storm Sewer

DIVING OPERATION: SCUBA SURFACE SUPPLIED AIR
 OTHER

PERSONNEL: Clayton G. Brookins, Valerie Roustan

EQUIPMENT: Scuba, U/W Light, Scraper, Lead Line, Probe Rod, Camera

TIME IN WATER: 4:30 p.m.

TIME OUT OF WATER: 5:00 p.m.

WATERWAY DATA: VELOCITY None / Negligible

VISIBILITY None / Negligible

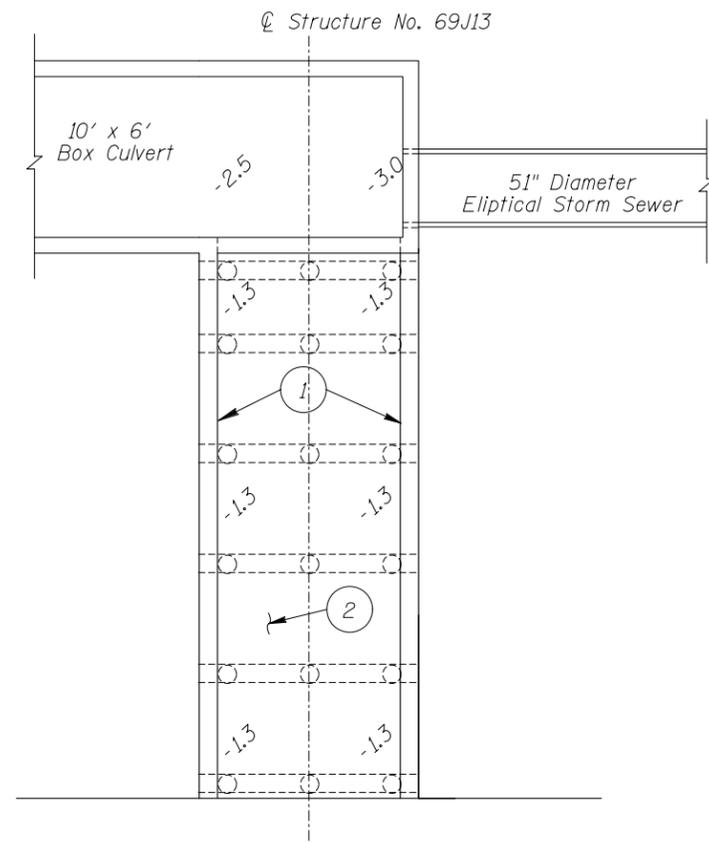
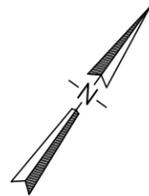
DEPTH 1.3 feet maximum

ELEMENTS INSPECTED: Culvert

REMARKS: Overall, the concrete of the structure was smooth and sound with no notable deterioration. The culvert section joints exhibited from ¼ to 1 inch maximum horizontal gap (at tongue and groove) connection with no complete separation of joint and vertically there was up to a ½ inch differential across joints. The channel bottom consisted of silt (6 inches maximum) on top of the culvert floor.

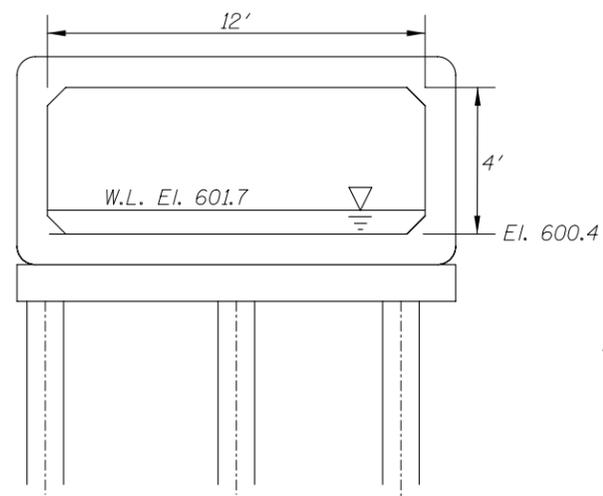
FURTHER ACTION NEEDED: YES NO

Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

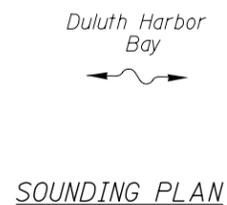


INSPECTION NOTES:

- ① The concrete was in smooth and sound condition with no notable deterioration. The joints between culvert segments exhibited 1/4- to 1-inch-wide gaps (at tongue and groove arrangement with no complete separations of joints) and up to 1/2 inch differentials between faces across joints.
- ② A 6-inch-thick layer of soft silt covered most of the concrete floor of the culvert.



TYPICAL END VIEW OF CULVERT



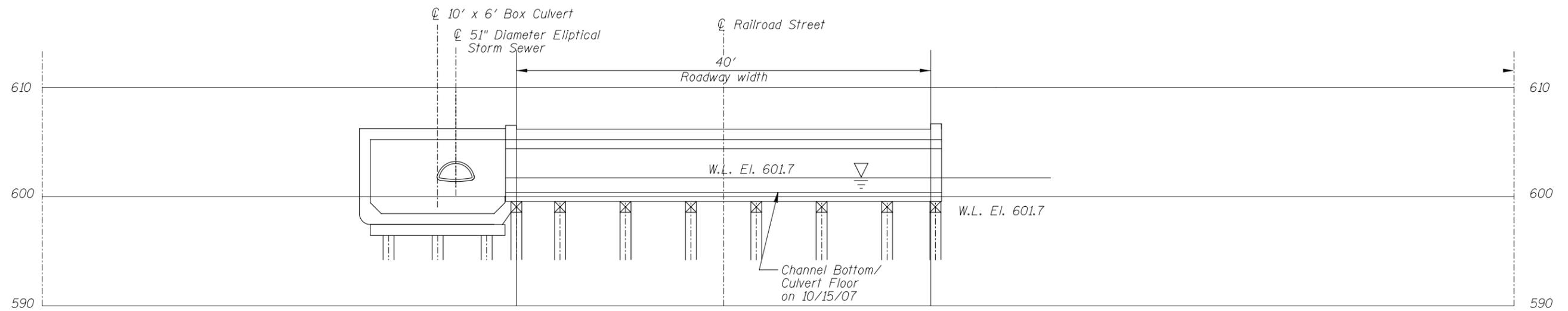
GENERAL NOTES:

1. The entire length of the box culvert was inspected underwater.
2. At the time of inspection, on October 15, 2007, the waterline was located approximately 2.7 feet below the top of the culvert opening at the north end of the culvert. This corresponds to a waterline elevation of 601.7 based on design plans.
3. Soundings indicate the water depth at the time of inspection and are measured in feet.
4. Soundings were taken parallel to the bridge at 1/4 point intervals between the substructure units as well as around the pier structures.

Legend

-0.4 Sounding Depth (10/15/07)

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 69J13 OVER THE STORM SEWER RIVER DISTRICT 1, ST. LOUIS COUNTY		
INSPECTION AND SOUNDING PLAN		
Drawn By: MDK	COLLINS ENGINEERS <small>123 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Date: OCT. 2007
Checked By: MDK		Scale: NTS
Code: 52219J13		Figure No.: 1



☉ CULVERT PROFILE

Note:

Refer to Figure 1 for General Notes.

**MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION**

STRUCTURE NO. 69J13
OVER THE STORM SEWER RIVER
DISTRICT 1, ST. LOUIS COUNTY
**UPSTREAM AND DOWNSTREAM
FASCIA PROFILES**

Drawn By: MDK	COLLINS ENGINEERS <small>123 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Date: OCT. 2007
Checked By: DGS		Scale: 1"=5'
Code: 52219J13		Figure No.: 2

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES
DAILY DIVING REPORT

INSPECTORS: Collins Engineers, Inc. DATE: October 15, 2007

ON-SITE TEAM LEADER: Daniel G. Stromberg, P.E., S.E.

BRIDGE NO: 69J13 WEATHER: Partly Cloudy, 48° F

WATERWAY CROSSED: Storm Sewer

DIVING OPERATION: SCUBA SURFACE SUPPLIED AIR
 OTHER

PERSONNEL: Clayton G. Brookins, Valerie Roustan

EQUIPMENT: Scuba, U/W Light, Scraper, Lead Line, Probe Rod, Camera

TIME IN WATER: 4:30 p.m.

TIME OUT OF WATER: 5:00 p.m.

WATERWAY DATA: VELOCITY None / Negligible

VISIBILITY None / Negligible

DEPTH 1.3 feet maximum

ELEMENTS INSPECTED: Culvert

REMARKS: Overall, the concrete of the structure was smooth and sound with no notable deterioration. The culvert section joints exhibited from ¼ to 1 inch maximum horizontal gap (at tongue and groove) connection with no complete separation of joint and vertically there was up to a ½ inch differential across joints. The channel bottom consisted of silt (6 inches maximum) on top of the culvert floor.

FURTHER ACTION NEEDED: YES NO

Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 69J13
 INSPECTORS Collins Engineers, Inc.
 ON-SITE TEAM LEADER Daniel G. Stromberg, P.E., S.E.
 WATERWAY CROSSED Storm Sewer

INSPECTION DATE October 15, 2007
 NOTE: USE ALL APPLICABLE CONDITION DEFINITIONS AS DEFINED IN THE MINNESOTA RECORDING AND CODING GUIDE INCLUDING GENERAL, SUBSTRUCTURE, CHANNEL AND PROTECTION, AND CULVERTS AND WALL DEFINITIONS TO COMPLETE THIS FORM.

CONDITION RATING

UNIT REFERENCE NO.	UNIT DESCRIPTION	MAXIMUM DEPTH OF WATER	SUBSTRUCTURE						CHANNEL					GENERAL					
			PILING	COLUMNS, SHAFTS, OR FACES*	FOOTINGS	DISPLACEMENT	OTHER (BRACING)	OVERALL SUBSTRUCTURE CONDITION CODE*	SCOUR	EMBANKMENT EROSION	EMBANKMENT PROTECTION	OTHER (DRIFT/DEBRIS)	OVERALL CHANNEL & PROTECTION CONDITION	CONCRETE	STEEL	TIMBER	LOSS OF SECTION	PREVIOUS REPAIR OR MAINTENANCE	OTHER
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Culvert	1.3'	N	7	N	8	N	7	8	N	N	N	8	7	N	N	N	N	N

*UNDERWATER PORTION ONLY

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NOTES: ATTACH SKETCHES AS NEEDED, IDENTIFY REMARK BY REFERRING TO UNIT REFERENCE NO. AND REMARK NO. USE GENERAL SECTION TO IDENTIFY OVERALL PRESENCE OF SPALLS, CRACKS, CORROSION, ETC.